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# USSR Report

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## ELECTRIC POWER AND POWER EQUIPMENT

### TOKAMAK-7 THERMONUCLEAR DEVICE PUT INTO OPERATION

Vil'nyus SOVETSKAYA LITVA in Russian 25 Sep 79 p 1

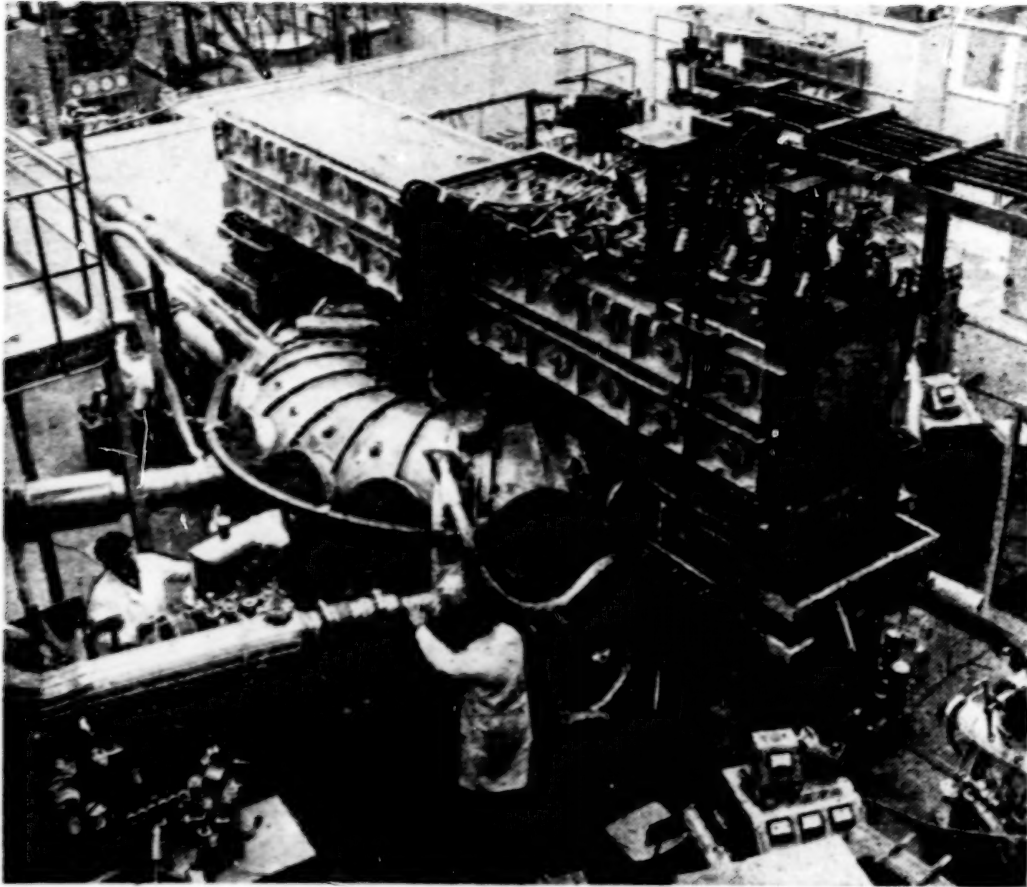
[Text] Tokamak-7, the first thermonuclear device of its type in the world with superconducting coils in the main magnetic field, is being put into operation in the Institute of Atomic Energy imeni I. V. Kurchatov with the joint assistance of the Kriogenmash scientific and industrial association.

In thermonuclear devices scientists are developing methods for obtaining a high temperature plasma and means for utilizing the energy given off by the hot plasma during fusion of the nuclei of hydrogen isotopes.

Copper coils have been used in all of the earlier constructed devices of this type to produce in large volume the strong magnetic field required to insulate the hot plasma, which has necessitated a rather large consumption of electric power. Using superconducting coils makes possible a 100-fold reduction in this consumption.

Hydrogen plasma is obtained in the device's combustion chamber which has a three cubic-meter capacity. Experiments have begun on testing its retentivity and degree of heat.

The construction and start-up of the Tokamak-7 device is an important new step in developing the engineering and technical bases for future thermonuclear power production.



An Overall View of the Tokamak-7 Thermonuclear Device

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## ELECTRIC POWER AND POWER EQUIPMENT

### COMMENT ON ANGARA-5 AS MODEL FOR FUTURE REACTORS

Moscow IZVESTIYA in Russian 11 Oct 79 p 2

[Article by IZVESTIYA special correspondent A. Ivakhnov: "Future Power Engineering is Born--One More Step Taken in the Institute of Atomic Energy imeni I. V. Kurchatov on the Road to Obtaining a Controlled Thermonuclear Reaction"]

[Text] In the next 5 years scientists are hoping to succeed in carrying out a controlled thermonuclear reaction in the Soviet device Angara-5. It will consist of 48 modules, gigantic electron guns aimed at a target the size of a walnut. The inside of the target is a combination of nuclei of the hydrogen isotopes deuterium and tritium. All of the guns will fire simultaneously. The overall power of the 48 electron beams will exceed the combined power of all the electric power plants in the Soviet Union. In several billionths of a second, the target will heat up to 100 million degrees. This is sufficient to cause fusion of the nuclei. The released energy should exceed that consumed in stimulating the thermonuclear reaction.

The prototype of this module, the Angara-1, was developed and constructed 5 years ago in the Institute of Atomic Energy imeni I. V. Kurchatov. It is composed of a power storage unit, a pulse-voltage generator 12 stories high for which industrial capacitors connected in-parallel have been installed and an electron accelerator resembling several cylinders of various sizes lying on their side and crossing each other. The first cylinder is man-sized in diameter and the last, from which the electron beam exits, can probably be held in the hand. The entire device occupies a single, certainly rather large, room. They showed me metal plates burned by the electron beam. In experiments with Angara-1 the specialists have learned to control this beam and govern its parameters.

This year, in compliance with one of the assignments of the comprehensive program (it appears in a number of the 200 programs for solving the most important scientific and technical problems of the 10th Five-Year Plan), it



is planned to put the first experimental module of the Angara-5 device into operation. The personnel involved in accomplishing the task have adopted a socialist commitment to do this ahead of schedule. And now the module is ready to run. In principle it is similar to the Angara-1 electron accelerator but differs from it in its capacity and size, occupying a room with several multimeter stories. The accelerator seems especially impressive from the balcony extending the length of the room at the second story level; it somehow reminds one of the Salyut-6 orbiting station, only more enormous yet. For convenience in assembling and operating the device, each unit of the accelerator is placed on a dolly and all of the dollies are on a track. One of Angara-5's control panels takes up about the same amount of space as the first Angara. The size of the whole device can be visualized (incidentally, a model of it is being exhibited right now in the Physics Pavilion of the USSR Exhibition of Achievements of the National Economy) as 48 such machines placed in a fan on two stories around the reactor inside of which the thermonuclear explosions will be set off.

On the eve of the module start-up, correspondents of the central newspapers and TASS met with the assistant to the director of the Institute of Atomic Energy imeni I. V. Kurchatov, corresponding member of the USSR Academy of Sciences Valeriy Alekseyevich Legasov.

"First of all," said the scientist, "we would like to discuss energy-producing problems and how we visualize them."

In mankind's lifetime a change from traditional energy sources to new, more ideal ones has taken place several times. And this did not happen because the old source was depleted. At one time, in fact, man had no source of light and heat but the sun. It did not occur to anyone that the star might be extinguished sometime but nonetheless people domesticated fire and began to burn wood. At the same time a qualitative leap occurred in the development of civilization. Food can be prepared on a fire and people in the houses were warmed by it. Then the wood yielded to coal. This was not because wood supplies had been exhausted. The new fuel was needed for steam-driven machinery. Some time passed and coal yielded its prominence in the energy-production market to oil. And again this was a new step in the development of civilization. Airplanes and cars appeared; the navy changed completely and industry underwent more active development. But as it happens there was about 10 times less oil in the depths of the earth than coal. The important thing here, apparently, is not in the overall stocks of one or another energy source but in the economy of mining it and its transportation to the consumer and the convenience of its use. And a change in sources does not happen in such a way that, shall we say, as we burn up one stock, we start on another. An altogether wider perspective must be taken on this question.

Right now we are all living in just such a period of the next change of energy source. In our day oil and gas seem to be the leading forms of fuel. But for each new cubic meter of gas or ton of oil it is necessary to go ever further to the north or east, to get ever deeper into the earth and as a result of this oil and gas will cost us more every year.

What then can replace the current energy source? Nuclear sources are emerging now as claimants for leadership in this project. Uranium stocks, if compared with, shall we say, coal stocks, are small--10,000 times less than coal. But per unit of weight it contains a million times more energy than coal. Thus, to obtain a certain amount of energy in atomic power plants it is necessary to consume 100 times less capital and labor than in extracting energy from coal. This also establishes the advantage of nuclear sources.

And one more important consideration is that since radioactive fragments are produced in splitting uranium nuclei, the atomic furnace itself must be very airtight in its structure so that none of these byproducts escape. And once such airtightness has been technically implemented, we will have acquired an energy source which will not contaminate the environment. This is one of the reasons why many countries are converting to nuclear fuel at this time.

But uranium resources are not unlimited either. Moreover, all of the uranium is not utilized in reactors now but only one of its isotopes, U-235, and it constitutes no more than one percent of the total mass of this element. Two ways are available for further searches for energy sources. One of them is the development of atomic power plants in which not only one isotope could be burned but all of the uranium. And the second way is to try to realize the energy from fusion of the light nuclei of the hydrogen isotopes deuterium and tritium rather than the energy from splitting the heavy nuclei of uranium. Deuterium supplies in the earth are quite large. It is contained in seawater, is inexpensive to extract and there is no need to search for deposits. They are always at hand.

In order to carry out a controlled thermonuclear reaction, two conditions must be satisfied. First, a temperature of approximately 100 million degrees must be produced. And secondly, it is necessary that the concentration of nuclei produced while this temperature is in effect not exceed a certain assigned magnitude. That is either the rarified gas is heated in seconds, so to speak, or we heat the dense compound of deuterium and tritium, the pellet, in a millionth of a second. The Tokamak device will operate on the first principle and the Angara type device on the second.

There are also two ways to heat the nucleus to such very high temperatures. This can be done with laser radiation or with charged particle beams. The second of these ways will be used in devices of the Angara type. From the point of view of engineering, it seems simpler and more reliable to us. All 48 modules of the thermonuclear device are identical and if the first of them which we are preparing to put into operation produces its share of energy, it means that we are on the right track. The conditions required for a controlled thermonuclear reaction will be produced in the Angara-5 device. The operation of future industrial thermonuclear devices can be visualized as serial detonations of deuterium and tritium pellets, each of which will produce its share of energy and these combined "shares" will combine into a continuous flow of energy. But this, of course, will not happen in the very near future. For now we are getting ready to start up the first module of the device in order to test its working capacity. As you know, a controlled thermonuclear reaction is an extremely complicated business and must be approached slowly, step by step.

"It should be noted," said Valeriy Alekseyevich, "that the staffs of many institutions and enterprises participated in developing and fabricating the experimental module." The basic equipment of the module was constructed and fabricated in the Scientific Research Institute for Electrophysical Equipment named D. V. Yefremov and in the Dvigatel' plant. The complex automation system without which the device cannot be operated was developed by specialists of the Union Scientific Research Institute of Toolmaking. Now, when the module is ready, it can be said proudly that our science and our industry have coped with the task."

The scientists, engineers and workers who participated in developing the thermonuclear module have fulfilled their commitment. The innovation has been put into operation ahead of schedule. At a meeting in the institute devoted to starting up the device, president of the USSR Academy of Sciences, Academician A. Alekseyevich spoke. He said that the start-up of the first module of Angara-5 was an important step on the road to mastering truly inexhaustible sources of energy.

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## ELECTRIC POWER AND POWER EQUIPMENT

### COMPLAINT ABOUT SLOWNESS OF PROGRESS ON BELOYARSK AES

Moscow IZVESTIYA in Russian 24 Oct 79 p 2

[Article by V. Biryukov in the column "Workers' Competition on an Atomic Giant": "Race to the Finish to Accelerate Installation and Check-out Work on Construction of the BN-600 Power Unit for the Beloyarsk AES]

[Text] The first light snow has whitened the fork of the highway leading to the Beloyarsk atomic power plant. The approach of winter feels even more distinctly. Who better than the Ural construction engineers has long known what untold difficulties the slushy period of late autumn and the low temperatures of the early winter season bring. When the unpreparedness of the construction and installation subdivisions engaged at the site of the third power unit has a perceptible effect on the labor efficiency of the entire group, it is impossible not to consider the lessons of last year.

We are obliged to speak of this today, 2 months before the Beloyarsk giant is to begin producing power, because the rate of building, installation and check-out work on the high-power reactor has been slowed perceptibly. What are the reasons? The people we talked to discussed them with concern.

Crew foreman of the fitters Yu. Podobedov: "Not long ago we finished installing the overload mechanisms in the reactor and are now installing the feeder pumps. It can honestly be said that this point would have been passed long ago under favorable conditions. The lack of installation crews, the technical inconsistency of the schedules and delay in the delivery of equipment and materials are hindering normal operation. And, you see, the temperature at night is quite a lot lower in winter. And this cannot help but affect labor productivity. Actually, our night shifts have not been organized yet, so the temperature changes have not bothered us. But that is for the present."

Party organizer of the construction staff V. Orlov: "Some of the managers try to explain the delay in the schedules only in terms of the designers' accounting errors. Of course, there have been errors in the design. After all, this is the first time in world experience that this kind of industrial model of a power unit is being produced. But even if designers' mistakes were not encountered, there would be difficulties in the installation and check-out in any case with the present work management."

Here is one of many examples. By today the electricians should have produced 199 heat zones but have only produced 36 in working order. Unless all of the zones are ready it is practically impossible to heat up the equipment. A wealth of experience in workers' competition has been accumulated in the crews participating in designing and fabricating the BN-600 power unit. Unfortunately, the heads of the installation section V. Pisarenko and A. Gotshalk are timid about undertaking it.

The oblast staff for construction of the new power unit meeting at the construction site at the beginning of October analyzed the state of affairs in the preparation for starting it up and also came to the conclusion that the main contractor, the Uralenergostroy trust (director A. Doronin) and its partners had not taken effective steps toward implementing the project schedules, especially on installation and check-out and were not ready to work under winter conditions. The main reason is the incompleteness of crucial staff positions, the lack of efficient labor management and inefficient dissemination of know-how about construction, especially by steam fitters, electricians, construction engineers and stationary engineers.

The response from USSR Mininergo to the Izvestiya editorial staff indicates that 288 steam fitters, 105 electricians, 146 construction engineers and 52 stationary engineers were assigned to the Beloyarsk AES during August and September. It is possible that these specialists were sent. But are all of them working at the site now? The director of construction P. Romanov claims that at minimum 130-150 steam fitters and electricians and more than 150 construction engineers would not be enough today in the most crucial parts of the installation and check-out work which, incidentally, is only being done on one shift.

The most unfortunate thing is that there is no kind of stability in the crews of specialists engaged in installation and check-out work. But, you know, the pre-startup period is just the time when these steam fitters are needed desperately. Adherence to the start-up deadline depends completely on their skillfully organized labor and, if you please, high creative performance. This calls to mind the overly successful appearance of G. Faynyuda before members of the board of managers of the Elektrouralmontazh trust. His words made it appear that the installation of equipment in the gas heater was completely finished and work on the ventilation system was close to completion. In a word, everything was being handled within the ministry-approved deadline.

Later it turned out that the successful speech of G. Faynyud lacked a firm basis. At the next meeting of the oblast staff he was not able to specify actual deadlines, particularly for completing the installation and check-out work on the steam dynamos although it is impossible to complete the operating production network reliably without timely high-performance installation and check-out of these systems.

In displaying responsibility for remanning the crews of construction, installation and check-out organizations, the USSR Ministry of Power Engineering and Electrification should not neglect the timely replenishment



of operating and maintenance crews with qualified personnel. Indeed, precision skill in controlling a complex reactor and the best results from its operation depend totally on the knowledge, mastery and technical preparedness of the people entrusted with the unique equipment.

The board of directors and party committee of the Beloyarsk AES have accomplished much toward training service personnel. On the basis of an operating enterprise has been developed a network of training courses and schools for communist labor. The workers, engineers and technicians undergo practical on-the-job training in other atomic power plants. However, the staff schedule has not yet been covered.

As already discussed above, the workers' competition may become a great help in improved placing of personnel and in the search for new forms of labor management. The initiators have this progressive form of competition. In the team groups of Yu. Podobedov, A. Vesenin, L. Urakov and V. Nogteva innovative beginnings have been made: combined schedules, collective workers' details and monthly and daily assignments with fewer personnel. Yu. Podobedov's crew, engaged on a difficult front (it installs the feeder pumps), has cut work deadlines in half and released four workers. The initiator of the workers' competition, bearer of the order Red Banner of Labor and veteran of the Beloyarsk AES A. Vesenin and his comrades have converted to a unified crew work detail. This has increased the responsibility of each crew and made it possible to search for new labor productivity resources. The crew of A. Vesenin has installed the plant's turboconductors which have an overall weight of 4,000 tons in a shorter time than the schedules projected.

There are many such examples of innovative search here at the construction site. It is important that the economic managers and social organizations take note of useful initiatives promptly, give them timely support, generalize the experience of the outstanding workers and make it the property of many. Graphic persuasion at the construction site, untiring mass political work of agitators, political informants and social staff members and road crews will work well for this.

Little time remains before the end of the work. In order to accomplish it in the designated period, there must be thorough preparation for work under the conditions of severe winter cold and maximum organization and collectivity with a smaller outlay of personnel and material to obtain the greatest return.

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## ELECTRIC POWER AND POWER EQUIPMENT

### KURA RIVER DAMMED AT SHAMKHORSKAYA GES

Baku VYSHKA in Russian 19 Oct 79 p 2

[Article by VYSHKA special correspondent A. Gamedov in the column "Letters from the Building Site": "Monolith on the Kura"]

[Excerpt] In the morning fog drifts over the Kura. A weightless blackness emanates from a vast gray bed which you guess is the river. But the fog cannot conceal the yellow of the high ridged left bank. The ridges are gullies. But there where the builders are working gullies are no longer seen. In their place a 1400 meter causeway for the Shamkhorskaya GES is being built from coarse gravel and loam. Its function, hopefully, will be to dam the Kura forever. Now the dam has already been raised to 120 meters. According to the plan another 42 meters must be added.

Director of the Shamkhorskaya GES construction administration R. Gamidov spoke with us.

"With us many such people are forgotten on the job," he said. "The entire crew is supported by them. They get others interested by their activity. The section head Gashimov, Guseynov's excavators and the drivers Ragimov, Dadshev and Adigezalov have all gained experience at this building site. But formerly the left bank section either fell behind or was not even organized. Urgent steps had to be taken."

Judging by the appearance of the dam causeway today, it must have been a bold maneuver. An experienced hydraulic construction engineer who took part in erecting the hydrosystem on the Araks and managed the construction of the Sarsangskaya GES on the Terterchay upon completion of the reservoir on the Arpachay, R. Gamidov quickly found the "sore point" at the large construction site. He understood how the delays which were occurring, if not eliminated, could slow the beginning of operation of the Shamkhorskaya GES with its reservoir extending almost 50 km which should irrigate 75,000 hectares of land in the Shamkhorskiy, Tanzskiy and Kasum-Ismailovskiy rayons. But in that section where the GES was being erected, lack of a bridge hindered the transfer of machines. The builders discussed the state of affairs at a party conference. The communists advocated carrying the equipment across on a ferry to the Akstafa area on the left bank, driving the machines 100 km under their own power, not considering the canyons and gullies, and starting work.



"Since we began to build the dam causeway without waiting for a bridge to be put into operation over the Kura," explained R. Gamidov, "we succeeded in accomplishing a large amount of extra work and at the same time paid off approximately 2 million rubles worth of debts planned from the start of construction. But 6 million rubles still remain to be made up."

And now the bridge is ready, joining the two shores. On both sides of the Kura construction continues on the cores of two dams, the causeway dam and the backwater dam. The Shamkhorchay was dammed at the beginning of the year.

"The river links us hand and foot," said the director of the builders' operations group Sh. Kuliev, standing on the slabs of its new channel. "Almost entirely dried up in the summer, it overflowed violently in the spring. From the first day they began to build the backwater dam, they worked in fear that it would wash away their work."

As you know, hydraulic construction has always been an expensive business. It is necessary to increase constantly the number of emergency facilities so that it is possible to build the main structures without worrying about impending danger. Thus, here at Shamkhorskaya, it has been necessary to build a dam, a bridge across the Kura. Knowing the results of the labor of construction engineers and authors of the Bakgidroproyekt staff, it is impossible not to give them their due. The river's water has been directed into a new channel in the area where the reservoir will be. It speeds its filling and then its water along with that of the Kura will go to irrigate fields and produce electric power.

Construction of the backwater dam which is protected from unexpected, stray water is close to completion. Everyone who climbs up on it has to admire its smooth and even walls, looking as if they were ironed. Whatever you say, the crew headed by N. Mustafayev is doing accurate work.

The dam has been raised so high that the people who work several stories lower and are employed under the management of section head R. Aslanov in pouring its core seem Lilliputian. More than 4 million cubic meters of dirt has been brought here. Every month the dam "swallows" 300,000 cubic meters of dirt (275,000 cubic meters according to the plan) but it is raised only a few dozen centimeters and still has not reached the size of the monadnock (as is called a mountain of water-impervious loam standing alone). The causeway dam will soon start proceeding from the left bank toward this mountain filling up the channel of the Kura and run together with it. All three--the monadnock, backwater and causeway dams--also form a monolith which is being prepared as an arch to span both the Kura and the future reservoir. Including the monadnock as part of the monolith was a great success on the part of the surveyors and planners since it frees people from a colossal amount of earth work and lowers the construction cost considerably.

Depending on the general conditions at the construction site, now one section, now another becomes a "hot spot." Today at the Shamkhorskaya GES it is the section for basic construction. A. Agamirov is in charge of it. If the

designation of target is expanded, then the construction, operational and emergency spillway is included. Here we again encounter an efficient decision of the planners where three projects are being built at one time and on a unified system. Now he calls our attention to the first category-- construction.

In order to raise the dam over the Kura, its channel had to be drained. And for this the river had to be turned to the right and passed through a spillway. Consequently, all further construction depends on when that will be accomplished.

"Right now there is nothing more complicated than this construction at the site," R. Gamidov says. "In addition, we placed a rigorous deadline before the section crew. Agamirov is talented, a manager who scrutinizes things and an innovator by nature. He has gained excellent experience as a hydraulic engineer in Terterchay. We also have decided to adopt his section contract method."

What is the new form of cost accounting and what are its features? A contract agreement with the construction administration management of the Shamkhorskaya GES is concluded by Agamirov upon completion of almost a million rubles worth of work. This is the first such case we have in the republic of a large-scale contract which a downstream construction crew has undertaken to fulfill. The section crew was obliged to raise labor productivity by 25 percent, reduce labor consumption by 20 percent, produce the main structure of the GES 27 days before the deadline and thereby accelerate the spanning of the Kura.

Its second feature is connected with the financial aspect of the job. For all the section employees--workers, service personnel, engineering and technical workers--earnings are calculated in terms of a single contract and in accordance with an assigned rank. Sixth rank is assigned to a section head and fifth to a foreman. But how are the workers' earnings to be determined? Exactly as if there were no differences between them and the engineering and technical workers. Crane operators, for instance, are sixth rank and are paid by the highest scale. A bonus of 50 percent of the amount due for the month is paid in advance for reducing the standard rate.

As is known, money loves counting. They know the value of labor both by the money and to the section crew. At the conference where the contract agreement was discussed, spears broke over two questions. Was it necessary for foremen to assign workers' ranks when there had been none until now? Did bonuses have to be given monthly which appeared to be a departure from the Zlobinskiy method which proposed receiving compensation after a project was completely finished? Agamirov, who was participating in developing the conditions for the section contract, emerged with an interpretation. He convinced them that a foreman should not only gain an understanding of the projects and estimates assigned to an economy but be able personally to recommend efficient bonuses in the process of building and installation operations. And his main working place is there where these operations are being done. He should organize the work, carry it out with careful planning, foreseeing possible difficulties in

advance and ways to eliminate them. Foremen K. Gadzhiyev and Kh. Magerramov answered to these specifications. And a bonus must be given every month so that people have a constant stimulus to increase rates, that is to work on the principle of producing a greater construction output today than yesterday. Only with such section work is the condition of the contract agreement fulfilled--to accomplish the project ahead of schedule.

It is important to stress this moment because the section crew undertook not merely to accomplish a fixed volume of work with excellent quality but also to be ahead of the calendar schedule although it has been calculated by very rigorous norms. In other words, it was necessary to work on three shifts and with no idle time.

"Wasn't it frightening to agree to such severe conditions?" was the question posed to Agamirov.

"But what is to fear if the goal is clear, you know how to achieve it and the people trust you? The main thing is to manage their work correctly and take responsibility for them; then they are sure to be completely spread out."

By the efforts of the production organizers of the spillway has been created an efficiently operating conveyer joining the concrete plant and the mills for manufacturing hardware and insulation materials. The foundation of the basic structures of the future hydrosystem are ground tunnels 12 meters high and 8.5 meters wide. The concrete walls forming these conduits are 4.5 meters thick in the lower part and 2.5 meters in the upper part. The walls are formed by filling all of this area with reinforcing steel and pouring in concrete. Work done all the time at this height cannot be called easy. How is it done; what is used as the base?

"Where there is already specialization, the quality of execution and performance is higher," reasoned Agamirov. "We came to this conclusion in building the Sarsangskaya GES."

Deepening the existing experience, they decided in the section to separate people into crews for fabricating and installing the reinforced casings, assembling and disassembling the metal sheathings, receiving and pouring the concrete and insulation, maintaining scoops and cables, vibrators and so on. With such an arrangement of forces, narrowed functions are entrusted to the workers, but they should accomplish them with irreproachable accuracy and in the required sequence. The reinforcing mesh installers, part of the Spetsgidroenergomontazh administration, also work on the contract agreement and without the least delay are providing a labor front for Agamirov's crews.

"We urge each other on and I am glad that the general contractor is not giving us any peace or we him." Director of subcontract installation section A. Makushnikov summed up the result of steady, mutually-demanding relationships. "The good results come from this."

"Look at the way we handle the dinner break," suggested Agamirov.

Fitter Sh. Adigezalov, N. Tanyrverdiyev and the crane operator remained behind in section No 7 of I. Nazarov's crew. While no one was in the section they were able to set up and tack the welding on all the sheets required for pouring concrete until the end of the first shift and until the second break. The fitters of this shift then see to the uninterrupted work of the third shift and so on.

When the second shift arrived, crew leader M. Movsumov said to his associate E. Iskenderov:

"Work better than we do but we won't stay behind for long."

Besides the good wish, what was said has a still hidden meaning. The crew leaders compete with each other. Getting ready for work, Iskenderov already knew how many cubic meters of concrete the first shift had poured. A tradition has been established: the achievement of rivals should be exceeded but not without their help because they should prepare everything needed for normal operation to be increased again. These are the conditions of the completion. In supplying the results, attention is paid not only to the indicators but also to how the crews help their reliefs.

Before the contract agreement was drawn up, the section staff accomplished 270,000 rubles worth of work every month. Now they do 350,000 rubles worth. This indicator is achieved by cutting the numbers by 30 people. The earnings of the people have also increased. The construction engineers are making an effort, realizing that on them in the first rank depends the spanning of the Kura, an event which should become the crown of the entire collective work, the overall labor.

At the All-Union Scientific and Practical Conference on ideological and moral education in Baku, it was mentioned that the example of the leading workers confirms and enriches the moral climate of each labor crew. The crews which are part of the section led by Ali Agamirov today represent just such a monolithic crew where there are no tardiness, absences or violations of discipline and no idle time.

I write with caution regarding the fact that there is no idle time. It is possible to say consistently that there was no idle time and will be none through the inherent fault of the builders. This is borne out by regular photographing of the section workday. But in a broad sense there may be idle time. On days in the trust they have heard the thunderous voice of the head of the construction administration R. Gamidov who, after repeated telegrams and telephone conversations achieving nothing, has abandoned the whole business and come to "try to get cement."

"What is being done?" He is indignant. "They are left without cement and work in all the sections has come to a stop."

They calm him down and promise him and he his own: "People are idle; we are ruining the plan even while we call for help."

As regards the cement, the construction administration of the Shamkhorskaya GES is always on a famine ration. In October a delay occurred due to lack of funds. The Azenergostroy trust received them late. Much of the blame also lies with the staff of the Karadagskiy cement plant which always disrupts the shipping schedule.

The bottleneck at the construction site is the work of the cement plant. Its equipment operates under a huge burden. Some of its parts--bearings, cylinder covers, gaskets and blades--are out of production. Repair is done on a primitive basis. For as much as six months the plant has not received any spare parts so that from this aspect too they may be disrupted.

The job of the construction engineers is complex, multifaceted and interwoven with difficulty. Any delay or malfunction is reflected painfully in all the sections. It is to be desired that they have no trouble. They are erecting a very large project today which will play an enormous role in speeding up the development of agriculture and power production in Azerbaijan but also they are paving new roads and testing effective forms for accomplishing construction. That is why all who are involved in this construction project should fulfill its requirements without delay. It is thought that acceleration of the job may be helped by the drawing up of the joint agreement for competition on the principle of a workers' competition between the general contractor, the subcontractors and the main building materials supplier, the Karadagskiy cement plant and other enterprises and subdivisions.

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## ELECTRIC POWER AND POWER EQUIPMENT

### THIRD TURBINE MOUNTED AT SAYANO-SHUSHENSKAYA GES

Moscow TRUD in Russian 11 Oct 79 p 1

[Article by A. Urman in the column "Report from the Leading Edge": "Across Five Northern Seas--Drive Rotor for Third Hydraulic Turbine Delivered to Builders of the Sayano-Shushenskaya GES"]

[Text] Leningrad turbine builders shipped it in the first days of September on the diesel boat Sovetskaya Yakutiya. The drive rotor for the turbine crossed five northern seas and the Krasnoyarsk reservoir, then arrived at the GES where it is permanently registered.

It is called permanent because the first two rotors at the hydroelectric power plant are replaceable. They will operate while the GES is being built. Then they will be dismantled and the third rotor, the official one, will receive the flow of water falling, at first, from a 120 meter height and, later on, from a 180 meter height. Using the turbine's drive rotor will make it possible for the unit to produce a planned capacity of 640 megawatts.

The ship Professor Lodygin slowly leads the barge with the cargo up to the moorage. Mooring at the Karlovskiy site is no easy task even for river transport workers of the Yenesei who are experienced and well-acquainted with the refractory nature of the river. In the tail race of the hydrosystem, the Yenesei churns so much that it is hard to secure the boat in place. It is tossed from side to side.

Cables are fastened to the mooring wall of the Karlovskiy site and the Professor Lodygin stands at anchor. Over the barge hover the hooks of a crane. The installers loosen the deck clamps of the drive rotor for the hydraulic turbine and begin to crank up the slings. The diameter of the official drive rotor is the same as that of the replaceable ones but it is very different from them in weight and shape. It is more than 50 tons heavier than a replaceable rotor. But the powerful crane easily raises it above the barge deck and conveys it to a transport truck.

The hydroelectric power plant in the Sayans is already in operation. It produced its first current in December of last year and now four million kilowatt-hours of electric power are supplied to the Siberian power system

every day from here. The unusually heavy flooding this year for almost half a month delayed the hydraulic construction engineers but the staff of the KrasnoyarskGESstroy administration did not deviate from the scheduled plan. Here in 1979 they resolutely decided to begin construction on two more hydraulic turbogenerator units.

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## ELECTRIC POWER AND POWER EQUIPMENT

### OUTLINE OF KAZAKHSTAN POWER EQUIPMENT CONSTRUCTION PROJECTS

Alma-Ata NARODNOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 3, Mar 79  
pp 23-24

[Article by T. Baturov, minister of energetics and electrification of Kazakh SSR]

[Text] The republic's power specialists are working with a great upsurge in labor engendered by the Plenum of the CPSU Central Committee; by the speech at the Plenum given by L. I. Brezhnev, general secretary of the CPSU Central Committee and chairman of the Presidium of the USSR Council of Ministers; by the 10th Plenum of the Kazakhstan Communist Party Central Committee; and by sessions of the Supreme Soviets of the country and of the republics affirming the far-reaching plans for the economic and social development of the Motherland and of the republic for 1979.

The majority of the collectives at power-production enterprises, plants and construction and installation organizations in the sector successfully executed the planned tasks and the socialist obligations accepted for the third year of the Five-Year Plan. The electric energy industry in the republic this year exceeded 59 billion kWh. Because of the introduction of a number of organizational and technical measures and new equipment, 25 thousand tons of conventional fuel were conserved.

Things are especially successful in the collectives of such GRES's as the Yermak, Dzhambul and Karanganda No's 1 and 2, the Ust'-Kamenogorsk TETs, the "Kustanayenergo" power system and the Alma-Ata and Chimkent mechanized columns, all of which fulfilled ahead of schedule the plans for 1978 according to all basic technical and economic indicators.

The collective at the Alma-Ata electromechanical plant is operating smoothly. By the first anniversary of the new USSR Constitution it had mastered the three-year portion of the Five-Year Plan.

Further, 16 of our enterprises, 500 shops and sections and 1300 shifts and brigades have earned the rank of collectives of communist labor.

Socialist competition under the motto "No One Is Lagging Here" grows all the wider at enterprises in the sector. The tone is being set by the combined brigade of the Kutanay northern power supply network, led by comrade Ul'danov; the welders brigade of the "Tsentrkazenergoremont" industrial repair enterprise (brigade leader comrade Kurtz); the superintendents section of the Alma-Ata mechanized column (the superintendent comrade Yurkin); by the shift at the boiler and turbine shop of the Yermokovskaya GRES (superintendent comrade Sergeev); and by others.

Following the decisions of the 25th CPSU Congress, the republic's power-production engineers continue the technical refitting and development of the industry. For example, being expanded are the Pavlodar TETs-3, the Kzyl-Orda TETs-6 and the Gur'yevsk TETs. Construction at the Alma-Ata TETs-2 is being carried out. With the engagement of the two 210,000-kW power units, the Dzhambul GRES achieved its designed output. In the past three years of the 10th Five-Year Plan more than a million kilowatts of new capacity have been put into service. Construction has begun at the Shul'binskiy hydraulic power system--the third step in the Irtysh cascade of the GES. Incidentally, the Shul'binskaya power supply network is intended for the solution of an entire complex of water conservation problems quite apart from its power-production tasks.

Plans have been made for the construction soon at the Ekibastuz fuel and power-production complex, a complex that has no peer in practice in world-wide power-plant construction. Into its complement will go five large-scale GRES's with a total output of 20 million kW, each equipped with power units of 500,000 kW individual capacity. Four of the electric power stations will be built in the area around the city of Ekibastuz, and the fifth will be near the southwest part of Lake Balkhash. They will all be outfitted with equipment and instrumentation which takes into account the latest achievements of science and technology.

The immense scale of the projects and the all-union importance of the economic and social tasks being solved have put the Ekibastuz fuel and power-production complex into the same rank as such leading construction projects as the BAM, the KamAZ and Atomnash.

At present in Ekibastuz projects are being conducted along a broad front--projects for construction of the GRES-1, the pioneer giant complex.

The electric power of these GRES's will go toward the development of the economy in Kazakhstan, the Urals, Western Siberia and the central regions of the country. For the realization of the transmission of this energy there is a broad program of power supply network construction.

An important event in the lives of the republic's power engineers was the completion of construction on the longest latitudinal electric trunk line in the country--the 500-kV transkazakhstan trunk line, stretching more than 1600 km from eastern Kazakhstan to the Urals.

The creation of this electric trunk line significantly increased the reliability of the electric power supply to the eastern, central and northern regions of the country, and made it possible in 1978 (along with the commissioning of the 500-kV power line from Novosibirsk to Barnaul) to connect the power system of Siberia into the country's common system through Kazakhstan. This significantly expanded its limits.

This year the 500-kV Ekibastuz-Temirtau electric transmission line was put into operational service. It is the main section of the trunk line from Ekibastuz through the Southern Kazakhstan GRES to Alma-Ata, Dzhambul, Chirchik and Frunze.

Construction is being completed on the 500-kV power line from Omsk, to which city electrical energy is already being supplied from the Yermak GRES on its way to Petropavlovsk.

Planning is now underway for the construction in the near future of an unparallelled 1150-kV electrical AC transmission line from Ekibastuz-Kokchetov-Kustanay, a distance of 962 km, for discharging the power of the Ekibastuz GRES's.

Great and complicated tasks stand before the power engineers and power-plant builders in the present year. They result from the decisions of the November (1978) Plenum of the CPSU Central Committee and the 10th Plenum of the Kazakhstan Communist Party Central Committee. First of all, we are to put the first two 500,000-kW power units at the Ekibastuz GRES-1 into operational service. In order to discharge this station's power into the region of central Kazakhstan it is necessary to convert the 220-kV Ekibastuz-Temirtau power line to a 500-kV rated line and to build a substation in the Temirtau region.

In 1979 the new Alma-Ata TETs-2 with 80,000-kW turbine units should be put into operational service. The power of the Tselinograd TETs-2 will continue to be increased.

Much has to be done in increasing the reliability of the economy's energy supply and in getting a maximum of fuel conservation in electrical and thermal power production.

All of this requires raising the level of guidance in all sections of the industry; it demands a maximum of concreteness and efficiency, efficiency and persistence; and it demands the intensification of responsibility on the part of each manager and executor for the assigned jobs and for their own sections of the work.

Power engineers in Kazakhstan will make a worthy contribution to the successful fulfillment of the far-reaching program laid down by the 25th CPSU Congress.

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## ELECTRIC POWER AND POWER EQUIPMENT

### CONSOLIDATED POWER SYSTEM FOR CEMA MEMBER NATIONS

Moscow EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV in Russian No 3, 1979  
pp 96-98

[Article by Anatoliy Maksimov, member of the collegium of the USSR Ministry of Power Engineering and Electrification: "Fruitful Collaboration"]

[Text] In 1959 the CEMA Permanent Commission for electric energy developed on the basis of proposals from the countries, concrete recommendations for consolidating the power systems of the CEMA member nations and for the construction of intersystem power lines of 110-kV voltage and higher.

The realization of these recommendations, approved at the 11th Session of the CEMA, became one of the basic directions for collaboration among the member nations of the Soviet and for the activity of the Commission.

This new stage of collaboration in the long-range development of the Consolidated Power System (OES) for countries of socialist cooperation originated with the 25th Session of the CEMA, at which was adopted the Combined Program for the Further Deepening and Improvement of Collaboration and the Development of Socialist Economic Integration. In it special attention was devoted to solving the problems of electric power engineering and, in particular, to the task of exposing the basic tendencies in the industry's development up to 1990 and the deepening and broadening of collaboration in this area.

Proposals for the solution to problems in the development of a Consolidated Power System in the countries, for increasing the number of interstate electric power lines, for improving the reliability of the electric power supply to the consumers and for the realization of the technical and economic advantages of the parallel work of the systems found their reflection in the Permanent Commission's General Scheme for the Long-Range Development of a Consolidated Power System for the European Member Nations of CEMA, including the corresponding collaboration with the electric power system of the SFRYu (Socialist Federated Republic of Yugoslavia), approved basically at the 30th Session of the CEMA (1976).

In the General Scheme, the expediency of creating a 750 kV network as the basis for the consequent development of intersystem links is technically and economically sound. The construction of a system-comprising network, being qualitatively a new step in the perfection of the parallel work of the countries' Consolidated Power System, will allow:

an improvement in the reliability of the electric power supply;

an increase in the networks' carrying capacity of planned as well as unplanned flows of energy;

a fuller realization of the economic effect of the parallel work of the OES (a reduction in the reserve power of the electric power stations, owing to a matching of the power reserves to the electrical load);

the construction of large-scale electric power stations of great individual capacity (thermal and atomic, with 800-, 1000-, and 1200-MW units);

the creation of large-scale projects through the efforts of the interested countries;

the improvement of the reliability of the parallel work of the OES's in those countries;

a decrease in the tension of the fuel-power balance in the individual countries of socialist cooperation.

As far back as 1974 the People's Republic of Bulgaria, the Hungarian People's Republic, the German Democratic Republic, the Polish People's Republic, the USSR and the Czechoslovak Socialist Republic signed a general agreement on the collaboration in the current stage of construction, through their common efforts, of a 750 kV electric power line and substations in Vinnitsa, the Western Ukraine and Al'bertirsha.

In accordance with the above-mentioned agreement, the creation and operation of the 750 kV power line projects are being carried out on the basis of proportional payments from the countries, determined by a special method.

The construction of a power line and its projects was carried out by the Hungarian People's Republic and the USSR--each country on its own territory.

For the examination and solution of questions connected with the construction and operation of the projects within the framework of the CEMA Permanent Commission for electric power, a conference for the authorized representatives of both sides was arranged.

The conference began the work in 1974 and has been systematically running it up to the present. During the course of the meetings important documents were drawn up relating to questions of the creation and operation of the



projects on the 750 kV power line. At the conference they examined the accounts of Hungary and the USSR about the progress in construction of the projects, and also the accounts of the other countries about the progress in fulfilling their obligations to supply goods as their proportional share in the construction.

The authorized representatives from both sides examined and agreed upon the draft of the basic technical decisions and the technical scheme for the transmission of electricity. They specified and approved the cost of the projects and also the volume of the proportional share for the countries in the construction. The representatives developed and agreed upon a number of important documents connected with the system's operation: for example, the method of determining losses and loss compensation of the electric power in transit; a method of loss compensation when the power line is operational; the operating regulations and the draft of an agreement on the realization of the intersystem effect due to the matching of load and reserve power schedules (which was signed at the 88th meeting of the CEMA Executive Committee); and an act of acceptance of the power line projects.

In the process of preparing the drafts and the above-mentioned documents, the appointed representatives from both sides were in constant contact with each other, which, to a significant degree, contributed to their successful work.

It is important to note that the designing and construction of the Vinnitsa-Western Ukraine (USSR)-Al'bertirsha (Hungary) 750 kV power line were accomplished through the close technical collaboration of the specialists of Hungary and the USSR.

The duties of chief designer are being performed on the USSR's side by the "Energoset'sproyekt" institute. It is accomplishing close collaboration with the Hungarian "Eretörv" institute. Works prepared by them were used in drafting the power line's general technical design. The design is intended for the power line projects located on the territories of Hungary and the USSR.

The Soviet side rendered vital technical assistance to Hungary in the design of separate assemblies and installations in the safety relays, the automatic emergency devices and communications for the power line projects spread across the territory of Hungary. At the same time the Hungarian specialists received from their Soviet colleagues advice on the designing, construction and operation of the 750 kV power line. It is sufficient to note that because of the questions just mentioned, 28 groups with complements of 145 men came here from Hungary on temporary duty assignments from 1974 to 1978.

In the jointly executed technical design the main power line possesses the following characteristics: the total length of the 750 kV power line is 842 km, which includes 270 km on Hungarian territory and 572 km on the territory of the USSR.

Approximately 90 percent of the line on Hungarian territory and 65.5 percent on the USSR's passes through arable land, while forest tracts and brush comprise 5 and 18 percent respectively. In the Soviet sector 120 km of the line passes through the Carpathians at altitudes of 500 to 1065 m above sea level.

From its beginning to its end 2,328 metal supports have been installed and 39,794 m<sup>3</sup> of reinforced concrete foundation have been laid, which includes 1,641 supports and 26,442 m<sup>3</sup> of foundation in the USSR and 687 supports and 13,352 m<sup>3</sup> of foundation in Hungary.

An open electric power distribution installation (ORU) in the shape of a triangle has been completed at the Al'bertirsha substation. One power line in the direction of the Western Ukraine substation is connected to two groups of 750/400 kV autotransformers of 1100 MVA capacity, manufactured at the Hungarian GANTS plant. At the Western Ukraine substation a 750 kV ORU was completed, one and a half times as large, for connecting the three power lines leading to Al'bertirsha, Vinnitsa and the Chernobyl'skaya AES to two groups of 750/330 kV autotransformers of 1000 MVA capacity each.

For maintaining the electric power transmission conditions six groups of 750 kV reactance coils of 330 Mvar capacity have been installed: one at the Vinnitsa substation; three at the Western Ukraine; and two at the Al'bertirsha. At the Al'bertirsha substation they have employed a complete insulated distribution installation of Hungarian manufacture and 400 kV voltage, while the basic 750 kV equipment, with the exception of the autotransformers, is of Soviet manufacture.

In accordance with the two-sided agreement, Soviet specialists have rendered broad technical assistance to Hungary in the installation and mounting of the 750 kV equipment supplied from the Soviet Union: switches, circuit breakers, current and voltage transformers and reactance coils. They also rendered assistance in the mounting and covering of the safety relays and the automatic emergency devices.

The Soviet side designed and delivered to Hungary the equipment of the compressor installation for the 750 kV ORU (and three complete compressors), and also rendered technical assistance in its mounting and facing.

As a result of completing the construction of the first 750 kV intersystem power line from Vinnitsa (USSR) to Al'bertirsha Hungary, they have insured the beginning of the parallel work on the OES's of the CEMA member nations and on the USSR's Unified Power System, which will make it possible to increase the mutual exchange of electric power and to raise the efficiency and reliability of the electric power supply to the nations participating in the OES.

The commissioning of the given power line and the organization of the parallel work of the OES's under qualitatively new conditions will guarantee to a number of nations an additional importation of electric energy and also make it possible for all countries to utilize the economic effect of a consolidated



power system. The realization of the intersystem effect due to the matching of the load and reserve capacity schedules can provide, on the whole, a savings of capital investments necessary for the construction of electro-stations of approximately 1500 MW total capacity.

One might note the following as the principal aspects of the positive experience of countries collaborating in the construction of a 750 kV power line:

1. The organization of the conference of authorized representatives from both sides, the work of which contributed to the successful commissioning of the power line.
2. The development of a draft of the basic technical decisions which underlie all subsequent design projects executed independently by the specialists of Hungary and the USSR.
3. The mastering of production in Hungary of 750/400 kV autotransformers.
4. The development by Hungarian specialists of supports for the 750 kV power line which conform to the climatic conditions of the other CEMA member nations interested in power line construction. These conditions differ significantly from those in the Soviet Union.

While these supports were being constructed, technical solutions were employed that are used in the USSR.

The accumulated experience of collaboration of these countries in the construction of the first 750 kV Vinnitsa-Western Ukraine (USSR)-Al'bertirsha Hungary power line in the CEMA member nations' OES may be successfully employed during the construction of the subsequent 750 kV power lines, in accordance with the General Scheme for Long-Range Development of OES's for Member Nations of CEMA--for example, the 750 kV Khmel'nitskaya AES (USSR)-Zheshuv Poland power line and also lines connecting the power systems of the People's Republic of Bulgaria, the Socialist Republic of Romania and the USSR.

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## ELECTRIC POWER AND POWER EQUIPMENT

### PLANS FOR SOLAR HEATING, COOLING TEST FACILITY IN CRIMEA

Moscow PRAVDA in Russian 26 Oct 79 p 6

[Article by O. Gusev, correspondent, Ukrainian SSR]

[Abstract] The article reports on plans for large-scale facilities for the study and utilization of solar. Construction is being contemplated in the southern USSR where clear weather prevails most of the year. An engineering and economic feasibility study for one such "heliocenter" in the Crimea has been prepared by a group of Kiev architects in cooperation with scientists of the Scientific Research Institute of Power Engineering imeni Krzhizhanovskiy and the Institute of Technical Thermophysics of the Ukrainian Academy of Sciences, which has been involved in solar heating studies for a number of years. The center will serve simultaneously as a facility for studying solar heating of buildings and as a unique "solar furnace" that converts radiation into thermal energy, according to A. Fert, one of the architects.

Another development in the field is a unique steam-heat system for various types of residential buildings, which has been proposed by associates of a solar power engineering laboratory in Kiev in cooperation with Moscow and Simferopol' scientists. The article reports that such systems have been successfully tested in a number of villages of the Crimea and Odessa oblast. The system's central unit is a solar boiler designed by the Kiev Scientific Research Institute of Sanitation Technology. The boiler is said to be capable of raising the temperature of water by 40 to 50 degrees in a few minutes. V. Khavansky, head of the solar power engineering laboratory, said that the development of still other facilities is contemplated. They include a central solar heating-and-cooling system of the resort city of Alushta. This system, which will be built on mountain slopes, comprises large solar energy receivers covering an area of up to 10,000 square meters, and special cooling units for the air conditioning of sanatoriums and rooming houses.

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## ELECTRIC POWER AND POWER EQUIPMENT

### OFFICIALS DISCUSS GEOTHERMAL POWER RESEARCH IN DAGESTAN

Moscow SOVETSKAYA ROSSIYA in Russian 16 Nov 79 p 3

[Article by D. Akhmedkhanov, A. Podol'skiy, correspondents]

[Abstract] The article consists of an interview with two officials regarding the problem of harnessing geothermal energy for practical purposes. One of the officials is A. G. Gadzhiyev, chairman of the Dagestan Autonomous Republic's State Planning Committee (GOSPLAN), who comments on achievements and tasks to develop geothermal power in Dagestan. As for future tasks, Gadzhiyev reports that the construction of a geothermal research and test facility is planned in Dagestan for purposes of refining plans for future electric power stations.

Kh. I. Amirkhanov, corresponding member of the USSR Academy of Sciences and chairman of the presidium of its Dagestan affiliate, discusses scientific and practical problems of geothermal power. The Dagestan affiliate is said to be playing an important part in solving these problems, one of which is the creation of fissures in underground rock. Amirkhanov agrees with Professor Yu. D. Dyan'kin, head of the problem-solving laboratory of rock thermo-physics of the Leningrad Mining Institute, that underground atomic explosions are not the only method of creating artificial fissures in rock. Based on the latest data, these fissures can also be made by prolonged cooling of a borehole with circulating fluid. This method, says Amirkhanov, opens up the immediate possibility of building geothermal electric power stations with capacity of tens of thousands of kilowatts. Belorussian scientists, working on another approach, are developing "heat pipes" that can conduct heat more intensively than copper. Amirkhanov notes that the Institute of Geothermal Power being created within the Dagestan affiliate will study the practical capabilities of these pipes, which can be made several meters wide and can be driven directly into the hot zone.

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## ENERGY CONSERVATION

### ELECTRIC POWER ALLOCATION ENFORCEMENT

Moscow MOSKOVSKAYA PRAVDA in Russian 19 Oct 79 p 1

[Article by A. Skal'skiy: "Allocation Provided From 'Reserves'"]

[Text] In September the managers of an aluminum alloy plant experienced several very alarming days. But the operation referred to as the "allocation provided from 'reserves'" saved them from severe penalties by the inspectorate of Mosenergo [Moscow Regional Power Industry Administration]. But there were reasons why this enterprise of the USSR Ministry of Nonferrous Metallurgy located in the capital was threatened with a cutoff of electric power.

Imagine at the outset an aluminum alloy plant. Its particular situation is that at this enterprise the production cycle is continuous. It has a document which certifies that the plant belongs to that category of enterprises for which interruptions in electric power supply are not allowed. The document was signed, to be specific, by a representative of Energosbyt [Department for Electric Power Sales and Distribution] of Mosenergo.

That same Energosbyt has been threatening the "most severe penalty"--partial cutoff of electric power.

A telephonogram stated:

"In the period from 1 to 4 September your enterprise consumed 21,000 kwh of electric power more than the established allotment."

A charge of the greatest seriousness, as we see. It went on to state that this overconsumption was to be made up before 1400 hours on 7 September. Otherwise the enterprise would be forcibly restricted in its consumption of electric power.

On the morning of 7 September V. Bogdanov, the plant's director, paid visits to superior organizations. The head engineer N. Panov provided explanations

to everyone over the telephone. The head electrician's office furnished the management documents, certificates, and information confirming that the punishment was unfair.

As a matter of fact, the plant did not exceed the standard rate of consumption of electric power per ton of aluminum alloys smelted, and it even was slightly below the allowance. Perhaps the allowances at the plant are too high? This is denied by an authoritative commission created by decision of the USSR Ministry of Nonferrous Metallurgy and the VPO [All-Union Production Association] Soyuzvtortsvetmet. But why, then, the overconsumption?

This is why: In September the plant operated according to a very strenuous program and undertook a sizable overfulfillment of the plan. In 1 month they decided to produce 400 tons of above-plan output. Compare this to the 200 tons which the collective had committed itself to smelt over and above the program for the entire year. Why was this kind of crash effort necessary? Very simple: In July the assignment was underfulfilled--the necessary raw materials were not available. That meant that the enterprise had to make an adjustment, to switch from one alloy to another so that production would not be halted. But every such change means a loss of 15 tons of alloys needed for intermediate smelting.

The USSR Ministry of Nonferrous Metallurgy and its VPO Soyuzvtortsvetmet allowed the plan to be corrected--for 400 tons to be carried from July to September. In September they began to receive the raw materials, and they began to "race" to fulfill the plan. The overconsumption of electric power occurred as a result. Yet this might not have happened if the ministry had promptly coordinated the operation of its enterprises supplying and consuming the raw materials.

Energosbyt of Mosenergo and its inspectorate follow closely the consumption of electric power at every enterprise. And they take the appropriate--often very severe--measures if the allotment assigned is exceeded. This is done by law, since ministries and departments have themselves been granted the right to establish how much electric power is to go to whom. This procedure seems reasonable, since the superior organizations know the situation not only at the subordinate enterprise, but also in the industry or subindustry as a whole. Thus there was a possibility of making an adjustment.

But this possibility is not always taken advantage of in a sensible way. As a result of the oversight by the VPO Soyuzvtortsvetmet, which followed directly from the oversight by the USSR Ministry of Nonferrous Metallurgy, a game of leapfrog was played with electric power allocations at Moscow enterprises. There was a sizable saving at some plants, and overconsumption at others.

This is no unfounded assertion. The evidence of this is the letter of guarantee which the ministry sent to Mosenergo: By 20 September they promised to increase the allocation at the aluminum alloy plant by 650,000 kwh, which



would be offset by corresponding reductions at other enterprises. But Mosenergo could not and had no right to wait until 20 September--an overconsumption of electric power at one enterprise means that another experiences difficulties.

The threat of the power cutoff greatly speeded up the handling of the matter in the USSR Ministry of Nonferrous Metallurgy, the association and the plant itself. In a few hours permission was obtained to adjust the allocations, the relevant documents were made out, and they were duly submitted to Energosbyt of Mosenergo. This surprising speed prompts certain reflections.

Since the allotments are rigid, how is it that the USSR Ministry of Nonferrous Metallurgy was able to find so quickly several plants for which these electric power allotments proved to be rather liberal? After all, they have yielded to their colleagues several hundred thousand kilowatt-hours without any damage to themselves! This situation is rather strange: there were more than enough candidates to be "philanthropists." But one of them proved to be particularly rich and generous--it covered the entire power shortage occurring at its cousin enterprise. This is the plant of secondary precious metals, which furnished 600,000 kwh from its "reserve."

N. Shamrayev, deputy chief of the administration of the head electrician of the USSR Ministry of Nonferrous Metallurgy, responded as follows to a request that he explain the state of affairs:

"Yes, as a matter of fact our VPO Soyuzvtortsvetmet did distribute allotments among enterprises incorrectly. Moreover, they didn't make a timely adjustment for September in accordance with the altered plan."

L. P. Seleznev, head engineer of the VPO Soyuzvtortsvetmet, said:

"Of course, the allotment could have and should have been adjusted earlier, in August. As for the annual need for electric power, we did plan a lower allocation in advance for the aluminum alloy plant. But the managers of the plant are at fault for this; they did not defend their positions, they did not obtain an adjustment in good time...."

Is there any need to comment on this case? Yes, it seems so. We cannot limit ourselves to the observation that the professional managers of VPO Soyuzvtortsvetmet, acting on the principle of "the rescue of those who are drowning is the affair of the drowning people themselves," have put their plant in the capital in an extremely problematical position.

The decree of the CPSU Central Committee and USSR Council of Ministers entitled "On Improving Planning and Increasing the Impact of the Economic System on Higher Production Efficiency and Quality of Performance" pays particular attention to the internal consistency of plans in their correlation with physical resources. As we see, the practice of the USSR Ministry of Nonferrous Metallurgy in planning the activity of its Moscow enterprises can only leave us puzzled in the light of these requirements.

## FUELS AND RELATED EQUIPMENT

### SECOND LIFE OF NEFTYANYYE KAMNI

Moscow PRAVDA in Russian 1 Nov 79 p 1

[Article by L. Tairov, PRAVDA Correspondent]

[Text] A gusher came in recently in the famous Caspian offshore oil fields of Neftyanyye Kamni. It may be that 20-25 years ago this event would not have attracted much attention: at that time the region was just coming under acquisition, and new gushers were a common thing. But this latest gusher in our republic is causing a lot of talk. And why not? Petroleum is coming out of a deposit that some had believed had no future. There had even been talk of imminent curtailment of production in these fields. And now we have a long-awaited new gusher in an area that has been exploited for a full thirty years.

And it is long-awaited. Geologists have not missed a day in looking for petroleum in the Kamni region. There are reliable indications that beneath the proved formations and those being exploited today lies yet another that is waiting its turn to serve mankind.

We hear from I. Guseynov, Hero of Socialist Labor and deputy of the USSR Supreme Soviet:

"Drilling technology has come a long way in the years that I have worked in the Caspian. Now we are armed with a steady platform that fears no storms or squalls. We are going to drill a total of ten slant holes from this platform. We are now driving our third, with a considerable deviation from the vertical. We are considerably ahead of schedule and will soon complete the six-year quota. The new deposit, the one that has just come in, we are calling 'The Twenty-Eighth of April.' On that day in 1920, Azerbaydzhan was brought under Soviet leadership."

At the same time, of course, the producing wells are not being forgotten. The number one job for all collectives working at Neftyanyye Kamni right now is to use these wells wisely, to keep them in apple-pie order and to carry out all processes under optimum conditions.



Since the beginning of the five-year plan, hundreds of rationalizer suggestions have been introduced, saving three and a half million rubles. Effective use is being made of the method of maintaining artificial formation pressure by pumping water into the ground, which has yielded a million additional metric tons of petroleum this year alone. Good results are coming from the use of gas-lift valves on so-called air-lift produced wells (those that have stopped free flow, and where technical facilities have to be used to extract petroleum). This saves scarce pipe, enables extraction of the petroleum in an automatic mode, and in the final analysis increases the extraction of fuel and chemical raw material. Before installing valves, wells 446 and 490 yielded five metric tons of petroleum per day, and that was mixed with water. Now each of them produces fifteen metric tons of the purest petroleum per day. There are already about 730 gas-lift wells on the field, and this number will increase. Automatic computer control is now being introduced.

The role of repairmen is increasing as the field grows and gets older. They are the ones who help to bring life back to many defunct facilities. At one time the extraction of oil from well number 1916 had stopped because the bit had got stuck underground. The repairmen had to work with watchmaker's precision to set things right. And the well that had been shut down began to yield seventy metric tons of petroleum per day. Changing well number 1619 to a higher stratum increased the daily yield by 25 metric tons, and washing out the sand plug in well number 1753 doubled the productivity.

The unique off-shore city of oilmen is increasing in size. In recent years, four five-story buildings have arisen on the causeway. Construction is in progress on a dining hall, a sports complex and a new club. From far off on the expanse of the Caspian, the green Marine Avenue will be visible. It is assumed that the oil fields, and the village with them, will advance further into the sea with time.

"The collective of Neftyanyye Kamni is working well and steadily," says K. Abasov, Hero of Socialist Labor and chief of the Petroleum and Gas Extracting Administration imeni the 22nd CPSU Congress. "During the Tenth Five-Year Plan this collective was often the leader in Soviet-Wide Branch Competition. We are greeting the 62nd Anniversary of the Great October Revolution with overfulfillment of quotas and socialist obligations."

The conquest of the oil fields of the Caspian goes on.

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## FUELS AND RELATED EQUIPMENT

### LOSS OF COAL IN TRANSIT

Moscow PRAVDA in Russian 1 Nov 79 p 3

[Article by V. Sonin, electrician, Torez Krasnaya Zvezda Concentrating Mill, Chairman of People's Control Group, I. Tereshchenko, engineer of the Dronovo Locomotive Depot, People's Controller, and I. Tikhomirov, Pravda Correspondent: "The Tracks Are Strewn With Coal"]

[Text] THRIFT IS EVERYBODY'S LAW. If a car is loaded with 65 metric tons of coal, how much reaches the consumer? One who is inexperienced in the vicissitudes of transportation would consider the question naive, to say the least, and would recall the law of conservation of matter. The experienced supply worker will not rely on academic erudition, but will glance at the accompanying documentation and see that several metric tons of cargo are missing. This seemingly strange result is not at all contradictory to the postulates of classical physics. The matter is simpler: the coal has disappeared in transit.

According to the competent conclusion of specialists, each railroad car loses about two metric tons in weight. This is the minimum. The maximum cannot even be guessed at: anything is possible. For example, some cars leaving the Donetsk Trudovskaya Mine for the Ladyzhinskaya State Regional Electric Power Plant, which is in Vinnitskaya Oblast, arrive with scarcely half the coal. And losses of 5-8 metric tons have become commonplace.

The cause of these "disappearances" has long been known. With the conversion to combine mining, coal has become finer, but the chinks in the coal cars are as big as ever. And the trains are going faster, so that the coal sifts through the holes and is blown upward by the wind.

It would be logical to assume that since the reasons for the leakage are so obvious, the capabilities for stopping it would be found. Actually, a good ten years ago specialists had worked out a simple set of steps. No, they did not suggest extracting the coal only in large chunks or reducing the speed of

the trains. Instead, they advised picking out the cars with minimum gaps, more exact determination of the optimum moisture content and the height of the "cap" in loading, packing and covering the coal with a special film. Are these recommendations being carried out?

"Pick out the cars indeed!" is the pained response to the first recommendation on the part of K. Georgiyan, chief of the loading and transportation board of the Ukrainian Ministry of the Coal Industry, and he shows statements of car inspections to back up his complaint.

It turns out that in a good half of the cars the coal can be hauled about as well as water in a sieve. Why do the coal packers indulge the railroaders in this way? After all, it is their right to determine the suitability of the cars.

"If you start getting picky, you won't have anything at all to haul coal in" is how the situation is summed up by Ya. Pestunov, chief engineer of the Torez loading and transport administration, V. Panfilov, director of the Komendatsk Central Concentrating Mill and others.

The railroaders don't take responsibility for safekeeping of particulate cargo in transit" says Ye. Shelekhov, chief of the Shakhterskoye loading and transport administration. "They just tell you to take it or leave it."

"Not so" counters M. Novikov, deputy chief of the Donetsk Railroad. "We repair more cars than any other railroad..."

The truth is that more freight is leaving Donbass than is arriving there. The shortage of cars is made up by nearby railroads. And as often as not, the rule in this case is: keep the best for yourself; give your neighbors what you don't want. And the coal gets the cast-off, unusable cars full of holes. The Ministry of Railroads should be more strict in looking into such preferential treatment.

"We could get the rolling stock into better shape ourselves," says I. Zakharov, team leader of the car repair shop of Shterovka Depot, "but we are short on metal, electrodes, lumber."

And obviously some thought must be given to putting material and technical supply into order.

And what about the other recommendations of specialists on reducing losses on shipments? The miners quite often violate regulations on coal surface treatment. It is not always leveled off, and even less often packed down, and never at all covered with a special film.

Even in the last five-year plan the USSR Ministry of the Coal Industry was supposed to see to it that facilities were erected for coating fuel with a protective film. According to the orders of the Ministry of the Coal Industry

there should be eight of these units in operation now in the Donbass. But there are none... even on paper.

Recommendations follow recommendations, orders follow orders, and life goes on. If the ministries of the coal industry and railroads finally take even the most stringent measures, everything will not change miraculously on the morrow.

And the cars are rolling. Every day thousands of metric tons of coal disappear in transit. Can these losses be cut even now? Let us assume that they can be and must be. After all, every mine and every depot has its own people's control group. What are they doing to reduce losses of coal in transit?

N. Slostin, chairman of the people's control group at Komendantsk Central Enrichment Mill, could not answer this question. The chairmen of the Shakh-terskoye and Krasnoluchskoye municipal people's control committees, N. Demidenko and V. Krasil'nikov (the workers at these mines pay the stiffest penalties for so-called underloading), admitted that they are not dealing with problems of coal transportation. Nor have the patrols of other cities "had time" for this business.

The people's controllers take a daily interest in the recovery of coal, and they battle for economic use in furnaces and boilers. True, these are all reserves. But when it comes to such a reserve as safekeeping of coal in transit, it's "out of sight, out of mind." Even minimum leakages, when multiplied by the number of cars dispatched each year, amount to losses of millions of metric tons.

Everyone needs coal, but the earth is tenaciously holding on to it. And as soon as it can be brought up by the hard work of miners, let's convert every kilogram to light and heat. But this requires a common concern for a frugal attitude toward railroad cars (in enterprises of every sector), for the quality of their repair, observance of the rules of selection and technology in loading and hauling fuel. Of course unannounced inspections and investigations will mean more work for the patrol posts and groups. But after all, the return could be considerable: the national economy of the country stands to gain a great deal.

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## FUELS AND RELATED EQUIPMENT

### NEW KASPBURNEFTEGAZPROM ASSOCIATION RESPONSIBLE FOR CASPIAN SEA DRILLING

Baku VYSHKA in Russian 16 Nov 79 p 2

[Article: "To the Depths of the Caspian for Fuel"]

[Text] Further development of oil and gas extraction in the Caspian is linked to conquest of great depths of the sea. In order to concentrate efforts of the offshore well drillers to the successful solution of this task the USSR Ministry of the Gas Industry created a specialized production association "Kaspburneftegazprom." S. Magerramov who is fulfilling the duties of head of this association stated:

"For over three decades the Azerbaijan oil workers have been carrying out industrial development of beds hidden under the sea bottom. For their exploration and operation powerful drilling and extracting enterprises have been created that today yield two-thirds of the fuel obtained in the republic. But the main riches storing "black gold" stretching to the depths of the Caspian and are removed farther and farther from the sea shores still remain for the oil workers of Azerbaijan to take.

In the new production association material and personnel resources are concentrated that are sufficient for working the explored fields and searching for as yet undiscovered sea deposits. The offshore administrations of drilling operations Peschaninskoye, Sangachal'skoye and "Neftyanyye Kamni," as well as three exploration administrations "Bulla," "Bukhta Il'icha" and "Primorskoye" have been transferred to us with all the equipment and personnel. In addition the technical arsenal of the association has been supplemented by mobile drilling units "Khazar," "Baky," and "60 let Oktyabrya." The offshore well drillers service the pipe-tool base, the plugging office, and the transportation administration.

Great resources are allocated for supplying the offshore oil workers with all that is necessary. The other day a self-propelled floating crane "Azerbaijan" came to Baku from Astrakhan, designed for assembly of individual offshore

platforms on promising segments of the sea. The floating giant that was completed in the mouth of Volga freely lifts to a height of 32 meters a load weighing 2,500 tons. On board it there are steam-driven hammers for driving posts into the sea bottom, other mechanisms and systems for constructing hydraulic-engineering structures at sea depths up to 300 meters.

The arsenal of oil workers in the Caspian soon will be supplemented by a semi submersible drilling unit (SSDU) "Kaspmorneft'." This complicated hydraulic-engineering structure equipped with powerful, drilling, diving and other equipment will make it possible to drill exploratory and development wells 6 kilometers in depth with thickness of the water layer 200 meters. The deep-water fields Shakhovomore, imeni 28 April and others are waiting for the platform where it remains to explore the lower levels of the fields.

Next year, completing the 10th Five-Year Plan, the association has planned 319,000 meters of tunneling, of which almost half are for the development wells. The main directions have been defined for the exploratory work and operational drilling. These are the Andreyev bank and Neftyanyye Kamni-2 located 10 kilometers to the southeast of the pile-supported city, the structure imeni 26 Baku commissars, imeni M. Kaverochkin and others. Work will be continued to study the region Bulla-more and other segments of the Caspian water area.

In fulfilling the tasks facing the new association the labor collectives and their leaders, commanders of production, and all the offshore well drillers will steadfastly recall the instruction of the 25th CPSU Congress on the need to accelerate the development and putting into operation of new oil fields. With the help of party and trade union organizations we will increase the effectiveness of competition unfolding in the administrations of drilling and exploratory work in honor of the 110th anniversary of V. I. Lenin's birthday, the 60th anniversary of the Soviet Azerbaijan and the Communist Party of the republic, and will activate work to spread experience of the leading workers in competition, and to strengthen the labor and technological discipline."

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## FUELS AND RELATED EQUIPMENT

### CONTRACTOR CONFUSION DELAYS PIPELINE CONSTRUCTION

Moscow STROITEL'NAYA GAZETA in Russian 24 Oct 79 p 1

[Article by M. Shumakov, deputy director of association Kuybyshevtransgaz:  
"General Contractor Lost"]

[Text] The extent of this trunkline that continues the gas pipeline Urengoy-Vyngapur-Chelyabinsk is 1,220 kilometers. Subdivisions of 17 general contracting trusts have been involved in its construction.

Many collectives have acted with a feeling of high responsibility towards the fulfillment of the task. Already the collective of the trust Soyuzvolgogaz has coped with the annual program; jointly with the trust Azmorneftestroy and the administration Chernomortekhfлот it has laid a gas pipeline through the Kuybyshev reservoir.

However on the whole on the route the situation is tense. Before the start-up there remains less than three months, and only half of the work has been done. The collectives of the trusts Lengazspetsstroy, Shchekingazstroy and Soyuzgazspetsstroy are fulfilling their assignments at low rates. By the way, the latter has an especially responsible task: it is necessary to lay three inverted siphons through the floodplain of the river Sok, 8 kilometers each. But the trust Mosgazprovodstroy in general has taken people from the route and sent them to other objects, although barely one-fifth of their work has been done.

The headquarters for construction of the gas pipeline created by the Ministry of Construction of Petroleum and Gas Industry Enterprises created in Novokuybyshevsk is poorly coordinating the work of the contracting organizations.

Besides the linear section on the trunkline it remains to put into operation three compressor stations. At the starting station No 9 the trust Vostokneftestroy has not even finished concreting the foundations underneath the compressors.

Initially the contractor at construction of compressor No 8 (Sergiyevsk), the start of last year, was the trust Tatspetsstroy, but in September it returned to the customer the obtained documents, motivated by the fact that the construction had been transferred to another trust. And to which trust is unknown. For compressor station No 10 (Syzran') in January the trust Vostokneftestroy of the Ministry of Construction of Petroleum and Gas Industry Enterprises was designated the contractor. But in June we were told by the Ministry of the Gas Industry that its construction has now been transferred to Glavsrednevolzhskstroy of the USSR Ministry of Industrial Construction. However the deputy head of Glavsrednevolzhskstroy I. Tsarev asserts that the Ministry of Industrial Construction has not been assigned the construction of this compressor station.

The contracting organizations have also not been defined for construction of residences for the maintenance personnel of compressor stations Nos 8, 10, 11 in the Kuybyshevskaya and Ul'yankovskaya oblasts. And since it is not known who will do the building, then the planning is being delayed.

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## FUELS AND RELATED EQUIPMENT

### RECORDS SET ON URENGOY-CHELYABINSK PIPELINE

Moscow STROITEL'NAYA GAZETA in Russian 24 Oct 79 p 1

[Article: "Commentary of Department of Industrial Construction 'SG'"]

[Text] The builders of underground trunklines have entered the last quarter of the year with good results. They have put into operation 4,746 kilometers of gas pipeline with an assignment of 4,655 kilometers. The "branch" Urengoy-Chelyabinsk that starts in the northern region of Tyumen' Priob'ye has reached the Urals in a record short time. Its length is 1,745 kilometers, and it was laid in less than a year.

What predetermines the success here? Thorough analysis of the experience accumulated in the construction of the first phase of the gas pipeline. And the main thing is a good preparation for the winter season which also permitted the builders in the most favorable period to pass the swampy regions of the Ob'-Irtys interfluvium. This time the builders not only worked at a high rate, but also strictly maintained the planned requirements for securing the pipeline.

In the third quarter the second phase of the gas pipeline was put into operation Perm'-Kazan'-Gor'kiy. Thanks to this the Tyumen' gas obtained an additional exit into the center of the country, whereby just before the beginning of the heating season.

We also felt the contribution of the builders of compressor stations. Ten of them were put into operation.

Thus the builders of the gas trunkline have made a serious claim to the successful completion of the 1979 plan. However this is not all that the country expects from them. It is important even today to lay solid foundations for highly productive work in the future year.

The main construction site of the closing year of the Five-Year Plan is the gas pipeline Urengoy-Nadym-Punga-Polyarnyy Ural-Vuktyl-Ukhta-Gryazovets with subsequent fork towards Moscow and towards Torzhok, further to Minsk-Ivatsevichi. The extent of this giant route is over 4,000 kilometers. The end of its construction is planned for 1981, while the main volume of work remains to be

fulfilled in the closing year of this Five-Year Plan. The task is not simple and requires the maximum mobilization of forces of the builders.

And this is important: on the route from Urengoy to Gryazovets, 2,300 kilometers, technical documents have been issued. They are available also for half of the route to Gryazovts to Moscow. So that now the matter is for the builders of the subdivisions of the Ministry of Construction of Oil and Gas Industry Enterprises! It is necessary to rapidly, in the space of October-November rebase the subdivisions to the north of the Tyumen' Priob'ye, in order to succeed in passing the swamps in winter. It is necessary to form in advance the construction-assembly technological lines, and to concentrate at the main points of the route the equipment, and to organize precise material and technical supply.

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## FUELS AND RELATED EQUIPMENT

### PROGRESS AND SETBACKS IN TURKMEN OIL DRILLING

Ashkhabad TURKMENSKAYA ISKRA in Russian 25 May 79 p 2

[Article: "Outlook for Drilling"]

[Text] In the Main Directions for Development of the USSR National Economy for 1976-1980 it is provided: "To increase the effectiveness of drilling operations. To reduce by 25-30% the periods for well construction by means of increasing the rates of drilling, introducing drilling units of universal assembly capability, two types of drill bits, mining engines, washing fluids, high-strength casings and drilling pipes, as well as by means of improving the organization of work and the application of progressive methods of well development."

Our correspondent O. Kirov asked the deputy general director of the association "Turkmenneft'" G. A. Bagdashrov to relate how the decisions of the 25th Congress are being fulfilled in the area of drilling in west Turkmeniya.

During the years of the 10th Five-Year Plan the association "Turkmenneft'" created new outputs for extraction of oil and gas related the deputy general director. Both exploratory and operational drilling was actively carried out on the largest fields in the republic, the Leninskiy and Nebit-Dagskiy. The boundaries and volume of their supply have been considerably expanded as a result of the discovery here of new deposits, productive blocks and beds. Several new fields have been put into development, Kuydzhik, Gogran'dag, Kizylkum, Burun, and the gas beds of Okarem. In the past year alone over 100 newly drilled oil and gas wells have been put into operation on all these fields. This made it possible to reduce the rates of natural drop in oil extraction.

This year the association "Turkmenneft'" is drilling according to a complex plan approved by the USSR Ministry of the Oil Industry. Thus, exploration for

oil and gas is being carried out on 24 fields in western regions of the republic and Central Karakumy. Deep exploratory drilling has been started on a new field Sapi-Karalyk. Supplies and the contours of their occurrence are being pinpointed at Cogran'dag, Erdekli, Keymir, Kara-Tep, and Chikishlyar. This year it remains to lay development wells on the field Ak-Patlaukh, from which the geologists expect encouraging results. Now the trust "Turkmenneftestroy" is laying to the new fields a road along which drilling machines and all that is necessary for drilling will be supplied. The question is being solved of supplying the new fields with water for technical purposes.

It is planned to carry out complex geological and exploratory work in Korpodzhi, south Bugdayli, north Kamyshldzh and other fields.

Work is successfully underway by the Kuydzhik administration of exploratory drilling whose collective is working on the level of the control figures of the Five-Year Plan. Many times it has won honored placed in the all-union socialist competition. Last year the administration drilled 5,700 meters of rock above the state assignment. The collective has written over a thousand meters of above-plan tunneling in its account this year.

However, the matter is not so successful in all administrations. Last year a great lag was permitted by the Okrem and Kotur-Tep administrations. Unfortunately, even the Nebit-Dag administration of drilling operations for the first time in the year of its existence did not cope with the state plan. All of this was reflected in the indices as a whole for the association "Turkmenneft": the plans for exploratory and operational drilling have remained unfulfilled.

This year measures were undertaken to overcome the lag. In particular, the matter was corrected in the Nebit-Dag administration of drilling operations. Its collective has fulfilled the plan for three months of the year.

The drilling rates were negatively affected by the separateness and remoteness of the fields and sections where drilling is being carried out, the lack here of supplies of water, the shortage of work force, and interruptions in the supply. The lack of a solid material base of drilling is especially sensitive in the association "Turkmenneft". The pipe base built, for example, over a quarter of a century ago no longer responds to the needs of the developing drilling. The volume and assortment of services is small, and the equipment is outdated. Construction of a new central pipe and tool base from year to year has been set aside due to the shortage of capital investments. Last year erection of this object was started, but it is being carried out by the trust "Turkmenneftestroy" slowly. The cost of the object is 2.2 million R, and a little over 300,000 R have been assimilated.

The drillers are waiting impatiently for the putting into operation of an enterprise which will guarantee calibration hydraulic tests, formation of drilling columns, defectoscopy of pipes, their repair and transporting to the drilling areas in the necessary quantity and assortment. At the base



a front will be developed for shipping to the pipe layers pipes already formed into sets and collected into bundles for a certain borehole. This will sharply reduce the lag both in transport and in the drilling brigades.

This year it remains for the association "Turkmenneft'" to drill and to begin operation of still over 100 new oil and gas wells. Above this the drillers are obligated to drill 1,800 meters of rock. Both the plan and the socialist commitment are intensive. They can be fulfilled only by using progressive methods of labor, the latest technique and technology, and by searching for reserves of production.

One such method is assembly of drilling machines made of large blocks. It is widely used in our drilling administrations. Unification of the assembly scheme, equipment assembled in large blocks, replacement of wood elements with stronger and safer metal elements of multiple-use, reinforced concrete foundations--all of this will make it possible to significantly reduce the periods of assembly of the drilling rigs, increase the quality of work, and this means have a positive effect also on reducing the periods of well construction.

However to transfer the assembly of boreholes from the large blocks it is necessary to have good approach paths and powerful auto transport. Transporting of large-sized, heavy equipment over our locality that is constantly intersected by moving sand dunes is very difficult without previously laid roads. And the transport, especially of high capacity is still insufficient. For construction of approach paths recently a specialized mobile mechanized column was set up by the association for the boreholes. And here the output of the administration of Ministry of Automobile Transport and Highways of the Turkmen SSR that is building the main roads is insufficient. Its potentialities are drastically behind the daily needs of the drillers. Due to the absence of roads drilling and operation of such a field as Gogran'dag is impaired, and the periods for development of many new fields have been postponed.

With the use of blocks for the solution the technology of preparing the washing fluid has been altered. The majority of drilling brigades of "Turkmenneft'" use a barite concentrate with moisture content no greater than 3%. It is transported by tank trucks, it is fed automatically into tanks which reduces the labor intensity, decreases the time for preparation of solutions and improves the quality.

The next step in this direction is the use of new reagents and formulas for preparing the washing fluids.

As yet the reserves of new bits of the AN, AV, and GNU type with oil-filled sliding support have not been exhausted. They contain a higher service life for considerably improved technical indices, commercial and scheduled velocity, and duration of active operation. It remains to widely spread the achievements of the best drilling brigades that have achieved high indices in the use of new technical resources. This in the first place

are brigades led by the foremen Yu. Mesropyan, V. Tret'yakov, V. Goloveshkin and others.

Great attention in this year should be focused on development of drilled wells. Often standstills emerge precisely in the development that considerably exceed the norm. Valuable time is lost which could be used for obtaining the product.

One of the most complicated and labor-intensive operations in development is installation of the dividing bridges. Failure here results in repeated, labor-intensive and complex operations. Now in the association hydromechanical oil-well drilling packers are being introduced on the pipes for installation of bridges. Two such sets that facilitate work have already been obtained. They will help to increase the quality and reliability of one of the most important operations.

Of decisive importance for increasing the effectiveness and quality is a well-thought out purposeful work with personnel. Mastery by all the workers, foremen, technologists and engineers of the leading methods of work, new technique and technology, increase in responsibility and discipline will make it possible to conduct the entire cycle of construction of wells on a high technical and organizational level. The results of the work done in this direction is being felt. Thus in the drilling the number of accidents has been reduced, the time for their elimination has been decreased, and the technological discipline is being observed more strictly. And this reserve needs to be used to complete measure.

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## FUELS AND RELATED EQUIPMENT

### RESULTS OF NINE MONTHS COAL PRODUCTION

Moscow TRUD in Russian 25 Oct 79 p 4

[Article by N. Budnikov, secretary of the trade union central committee of workers of the coal industry, and Yu. Skvortsov, deputy head of the section of production work and wages of the trade union central committee: "Equal to the Outstanding Workers"]

[Text] The third quarter has ended. The most important period for the coal industry has started, the fall-winter period. The fulfillment of the annual commitments in many other branches of the national economy depends on the results of work of the miners in the last quarter.

Many mining collectives have written in the last quarter in their above-plan account tens of thousands of tons of fuel. An example of the creative approach of organization of active socialist competition for work without lags is shown by the workers, economic leaders and specialists, and social organizations of the Kostenko, "Nagornaya," 50th anniversary of Great October, "Vorgashorskaya," "Estoniya" and a number of other mines. Great potentialities for increasing the rates of coal extraction due to the use of scientific organization of labor, a high level of professional skill and discipline, and the effective use of mining technology have been shown by the participants in competition on the agreement. This is convincingly stated by the results given above in the work of 52 collectives of the brigades and sections out of 82 who were ahead of the planned schedule, and have already yielded over 1.6 million tons of coal and shale in addition to their commitments. As always, the miners of the celebrated brigade of Hero of Socialist Labor, USSR State Prize winner M. Chikh are working excellently. There is no doubt that the commitment to complete the Five-Year Plan by the 110th anniversary of V. I. Lenin's birthday and to achieve for the Five-Year Plan not 5 as noted in the beginning, but 6 million tons of Anthracite will be fulfilled with honor.

The "500 leading workers," working on different domestic equipment, often in complex mining and geological conditions are the first to practically verify and provide a permit to life for many innovative engineering solutions.

At the same time such highly productive work, naturally, makes ever more severe requirements for the use of each minute of working time, and for the

complex solution to all the questions of organizing the coal extracting production--from extraction of coal in the underground face to its shipping to the consumer in railroad cars. The development of the movement of leading workers, growth in intensification of the processes of coal extraction with ever greater acuteness place before the organizers of production the problem of accelerating the rates of carrying out mining work and preparing a quality working face; elimination of the present disruption in the level of mechanization of the main and so-called auxiliary operations; sharp increase in the reliability and quality of manufacturing the mining transporting equipment produced at the plants of coal machine construction.

Today as never before not only is it required to fulfill in time an amount of work, but also to be continually concerned about future development of the mining industry.

Unfortunately far from all the organizers of production have understood this truth. An example of such misunderstanding is the leaders of the mine "Yubileynaya" and the general director of the production association Gidrougol', he is also the director of the institute VNIIGidrougol' [All-union Scientific Research, Planning and Design Institute of Hydraulic Coal Mining] A. Contov. The collective of this mine has a renowned history. Here many designs of the scientists and designers have successfully passed experimental checking on perfection of the hydraulic method of coal extraction, here on the initiative of the renowned brigade-millionaire G. Smirnov the movement of collective tutelage received a new impulse. Comradely mutual assistance, labor enthusiasm and skill of the miners permitted the brigades of Ye. Musokhranov and R. Mingulov to master a load of a million tons in a short time. And here it was found that the leaders of the mine and association were not capable of supplying engineering support to the working initiative, and could not create conditions for the preservation of such rates of coal extraction. Last year the brigade of Ye. Musokhranov with a commitment to yield a million tons of coal owed the plan over 300,000 tons. But no conclusions were drawn. Moreover, a lag in the preparation of mining work, high accident rate of the hydraulic transport and hydraulic lift, omissions in the material and technical supply, and volitional planning this year placed the famous brigade in an even more serious position. After the workers turned for help to the higher organizations, reporting to the meeting of the board of the USSR Ministry of the Coal Industry for reasons of unsatisfactory work, the general director of the association assured both the ministry and the trade union central committee that all measures will be taken to impose order and create for the brigade conditions for the fulfillment of the adopted commitments. In April an order was issued for the association to eliminate shortcomings, but its practical realization has not been followed. The brigades of the former "millionaires" Musokhranov and R. Mingulov practically have lost hope of mastering : but is even two times smaller. The collective of G. Smirnov must also : in the remaining months with intensified forces in order to preserve its place among the "millionaires."

Such collectives that are known to the entire country have been placed in a similar situation such as the brigades of V. Murzenko, G. Mikhaylichenko, N. Putra, A. Polishchuk, and I. Rogovskiy.

Results of Work for Nine Months of Collectives of the Brigades and Sections  
That Have Concluded an Agreement on Competition for Extraction in the 4th Year  
of the Five-Year Plan for 500,000 and More Tons of Coal (Shale)

Brigade Foremen, Head of Section	Mine, Production Association	Commitments for 9 Months (1,000 T)	Actually Extracted (1,000 T)
A. Salamatin (head of section)	"Mikheylovskaya," Karagandaugol'	863.5	893.2
M. Chikh	"Mayskaya," Rostovugol' mines	875.0	876.1
M. Beshetnikov	"Lyryanovskaya," Yuzhkuzbassugol'	750.0	823.9
A. Kolesnikov	"Molodogvardeyskaya," Krasnodon- ugol'	796.0	806.1
V. Devyatko	"Raspadskaya," Yuzhkuzbassugol'	750.0	771.2
N. Skrypnik	Mines imeni Frunze, Donbassantra- tsit	705.3	752.6
A. Polishchuk	"Trudovskaya," Donetskugol'	728.9	699.9
G. Smirnov	"Yubileynaya," Gidrougol'	761.2	672.7
V. Tuzinovich (head of section)	Mines imeni Kostenko, Karaganda- ugol'	627.9	658.0
V. Zhukov	"Polysayevskaya," Leninskugol'	616.6	652.9
I. Shak (head of section)	"Vorgashorskaya," Vorkutaugol'	573.6	626.0
E. Motsak	Mines imeni Kosmanovtov, Donbassantratsit	535.5	604.5
N. Gladkikh (head of section)	"Shakhtinskaya," Karagandaugol'	654.4	603.6
I. Serezhinskiy	"Oktyabr'skaya," Vorkutaugol'	537.4	583.9
V. Murzenko	"Krasnyy partizan," Sverdlovan- tratsit	784.2	580.8
Yu. Brannikov	"Severnaya," Vorkutaugol'	553.6	576.0
G. Yemel'yanov (head of section)	"Vorgashorskaya," Vorkutaugol'	559.7	567.5
A. Del'yan	"Severnaya," Vorkutaugol'	554.2	554.2
N. Stakheyev	"Nagornaya," Gidrougol'	461.0	530.0
V. Fedorenko (head of section)	Mines imeni Kostenko, Karagandaugol'	486.3	529.5
A. Beravry (head of section)	"Komsomol'skaya," Vorkutaugol'	479.3	527.0
A. Titov (head of section)	"Podmoskovnaya," Novomoskovskugol'	455.4	516.6
N. Karobitsyn	"Oktyabr'skaya," Vorkutaugol'	582.0	509.4
Yu. Khalivayev (head of section)	Mines imeni Kostenko, Karagandaugol'	475.8	501.2
Ye. Drumdetskiy	"Nagornaya," Gidrougol'	453.0	498.3
V. Barlyshev	"Novokuznetskaya," Yuzhkuzbassugol'	400.0	491.6
I. Safonov	"Pervomayskaya," Kuzbassugol'	467.9	482.6



A. Nikolayev (head of section)	Mines imeni 50th anniversary of October Revolution, Karagandaugol'	451.9	482.0
A. Pel'fut (head of section)	"Stepnaya," Karagandaugol'	428.4	477.2
V. Belin (head of section)	Mines imeni Gorbachev, Karagandaugol'	429.0	474.3
A. Potapov (head of section)	"Vorgashorskaya," Vorkutaugol'	466.4	474.0
A. Karzhov	"Inskaya," Gidrougol'	371.0	473.8
K. Markelov	Mines imeni 50th anniversary of October, Gukovugol'	432.6	472.3
V. Sabashnikov (head of section)	"Yur-Skor," Vorkutaugol'	482.7	472.0
A. Izaleiko (head of section)	"Zapadnaya," Intaugol'	417.8	471.2
A. Nikitin	"Nagornaya," Gidrougol'	436.0	470.4
V. Bovi	"Tyryanovskaya," Yuzhkuzbassugol'	433.0	462.4
A. Rosanyuta (head of section)	"Severnaya," Karagandaugol'	425.9	461.6
V. Shmakov (head of section)	Mines imeni Kostenko, Karagandaugol'	434.1	459.9
A. Kan (head of section)	"Maykudukskaya," Karagandaugol'	463.2	455.6
S. Afanas'yev (head of section)	Mines imeni Kostenko, Karagandaugol'	453.7	454.4
A. Partel'	"Estoniya," Estonslanets	422.2	441.9
V. Ivanov	"Akhtme," Estonslanets	400.8	441.1
I. Larchenko	"Estoniya," Estonslanets	418.5	438.2
I. Kanayev (head of section)	"Vorgashorskaya," Vorkutaugol'	447.2	436.4
A. Bushchenko	"Glubokaya," Rostovugol'	404.9	432.0
D. Spirin	"Zarechnaya," Gidrougol'	407.0	424.4
G. Abramov	Mine/administration "Butovskoye," Makeyevugol'	373.1	424.1
E. Vakht	"Vira," Estonslanets	408.7	424.1
V. Borisenko	Mines imeni Lenin, Voxoshilovgrad-ugol'	421.1	423.6
A. Zhakupov (head of section)	Mines imeni 50th anniversary of October Revolution, Karagandaugol'	398.2	423.2
E. Fufikov	"Komsomolets," Leninskugol'	383.7	421.8
P. Kaminskiy	"Butovka-Donetskaya," Donetskugol'	384.7	416.8
Ye. Vilimas (head of section)	"Intinskaya," Intaugol'	480.0	404.6
I. Medvedev	"Severnaya," Sredazugol'	405.2	401.2
I. Kupran	"Akhtme," Estonslanets	387.4	400.4
V. Ignat'yev	"Krasnolimanskaya," Dobronol'yugol'	405.6	394.3
N. Lakushev	"Krasnoluchskaya," Donbassantratsit	391.7	386.2



A. Uvarov	"Ayutinskaya," Rostovugol'	378.9	382.2
V. Kolokol'nikov	"Raspadskaya," Yuzhkuzbassugol'	535.0	381.0
V. Dzivak	"Viru," Estonslanets	375.2	378.3
V. Petrov (head of section)	Mines imeni Gorbachev, Karagandaugol'	383.0	377.9
A. Yesenbayev (head of section)	Mines imeni 50th anniversary of October Revolution, Karagandaugol'	365.0	371.9
I. Levin (head of section)	"Zapadnaya," Intaugol'	372.5	369.9
G. Vertel' (head of section)	"Vorgashorskaya," Vorkutaugol'	383.3	369.8
O. Sillari	"Estoniya," Estonslanets	358.4	361.7
I. Samkov	"Inskaya," Gidrougol'	371.0	355.8
Ye. Yerokhin	"Belozerskaya," Dobropol'yeugol'	373.2	355.3
Ye. Boldyrev (head of section)	"Podmoskovnaya," Novomoskovskugol'	359.6	352.9
G. Mikhaylichenko	"Korkinskaya," Chelyabinskugol'	374.2	348.6
N. Putra	"Chertinskaya," Leninskugol'	350.0	335.8
V. Yekimov (head of section)	"Kapital'naya," Chelyabinskugol'	374.2	331.4
L. Kon'kov	Mine/administration "Gramoteinskoye Obelkemenorovougol'	400.0	321.9
V. Milyukov (head of section)	"Intinskaya," Intaugol'	392.0	320.1
N. Kas'yanov	"Raspadskaya," Yuzhkuzbassugol'	413.0	316.1
I. Rogovskiy	Mines imeni S. M. Kirov, Leninskugol'	337.7	314.5
G. Musokhranov	Mines imeni 7 November, Leninskugol'	350.9	305.3
R. Mingulov	"Yubileynaya," Gidrougol'	374.3	302.8
A. Popov	"Raspadskaya," Yuzhkuzbassugol'	380.0	294.8
Yu. Semion	Mines imeni Kosmonavtov, Donbassantratsit	324.4	271.2
Ye. Musokhranov	"Yubileynaya," Gidrougol'	374.3	240.8
V. Mos'kin	"Gukovskaya," Gukovugol'	356.5	194.8

The reasons for the nonfulfillment of the commitments most often consist of a disruption in the schedules for preparing new longwalls, unsatisfactory material and technical supply, disruption in the patterns of repair-preventive work, shortages in the number of the brigades in accordance with the recommendations of the technological plans, i.e., refer completely to the competence of the engineering-technical, supervisory workers of the mines and technological services of the production associations. Therefore any facts of irresponsible attitudes of the leaders of production to the branch standards of socialist competition apparently require the strictest and most fundamental party evaluation and corresponding conclusions.

The territorial committees of the trade union should sharply activate work of their operational groups with control over the creation of conditions for highly productive labor, achieve the timely and complete fulfillment of measures directed towards elimination of shortcomings in the organization of labor, and overcoming of the permitted lag.

The reports and elections that have started of the mining committees of the trade union must become a public forum for discussion of the situation, for criticism of negligent, passive workers, facts of lack of discipline and poor management, and to mobilize the collective for an unconditional fulfillment of the plans and commitments of the last quarter and of 1979 as a whole.

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## FUELS AND RELATED EQUIPMENT

### BRIEFS

KOMI OIL--Ukhta, Komi ASSR 9 Sep (PRAVDA)--The seismological explorers have obtained yet another success in the Pechora geophysical expedition after long and persistent searches for oil in the tundra. At the Pyadeysyuskaya field during the watch of the brigade of drilling master V. Venskovskiy the first well came to life. From a depth of 3,800 meters an influx of high quality oil was obtained. The rates of exploratory work in the Bol'shezemelskaya tundra in this Five-Year Plan as compared to the last have more than doubled. Here tens of structures have already been discovered that are promising for oil and gas. The seismological explorers and oil and gas explorers together are doing their bit towards development of the fuel and energy resources of this region. [Text] [Moscow PRAVDA in Russian 10 Sep 79 p 1] 9035

YAKUTSK NATURAL GAS--In advance of the schedule the second phase of the 400-kilometer blue fuel trunkline is being constructed from the basin of the Vilyuy river to Yakutsk and Pokrovsk. With its introduction into operation in the last year of the current Five-Year Plan the cities and settlements of the central region of the Yakutsk ASSR will be supplied with natural gas. [Text] [Moscow STROITEL'NAYA GAZETA in Russian 24 Oct 79 p 1] 9035

SURGUT GAS REFINERY--With the start-up of the Surgut gas refinery gas flames will be extinguished at many oil fields of Tyumenshchina. The glycol, hydrocarbons of wide fraction, and liquefied gas from Surgut along the product pipelines will enter the Tobol' petrochemical complex. Now the assemblers of the Surgut administration of the Zapsibneftekhimmontazh trust ahead of schedule are fulfilling work on objects of the first phase of the plant which must enter into operation this year. [Text] [Moscow STROITEL'NAYA GAZETA in Russian 24 Oct 79 p 1] 9035

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